REMARKS

Claims 14-19 remain in this application. Claims 14-19 have been amended. Claim 14 is an independent claim.

A. Amendments to the Abstract and the Title

In the Office action dated April 30, 2004 a correction to the Abstract was required. It was stated that the Abstract was not directed to the claimed invention of a process of making. In response, Applicant has amended the Abstract to be directed to a process of making. Line 1 of the original Abstract read "An acoustic resonator includes a ferromagnetic compensator . . ." Line 1 now reads, "A method of fabricating an acoustic resonator includes forming a ferromagnetic compensator, such as one comprised of a nickel-iron alloy, . . ."

By amending the Abstract in this manner it is more specifically directed to a process of making and follows a process of steps. In addition, the sentence, "In the preferred embodiment, the compensator is formed of nickel-iron alloy, with the most preferred embodiment being one in which the alloy is approximately 35% nickel and approximately 65% iron" has been deleted so as to provide a more concise statement of technical disclosure of the patent.

Regarding the title of the application, the Office action stated that the title was not descriptive and suggested the following title: "A Method of Making an Acoustic Wave Resonator." Applicant agrees to the Office action's recommendation and has amended the title to reflect said recommendation.

B. Amendments to the Specification:

The paragraph beginning on page 8 and continuing on page 9 of the pending application has been amended to delete the word "electrical" and add the word "electromagnetic". This was done to maintain consistency between description in the Abstract and description in the specification.

The Office action objected to Fig. 4 as not complying with 37 CFR 1.84(p)(5) because element 234 was not mentioned in the specification. In response to the objection, Applicant has amended the specification to

include element 234. On page 9, in paragraph one, line 10 which originally read ". . . if electrode 212 is over the silicon substrate" now reads ". . . if electrode 212 is over the silicon substrate, wherein cavity 234 is contained." By amending page 9, Fig. 4 now complies with 37 CFR 1.84(p)(5), and Applicant respectfully requests that the objection to Fig. 4 be removed.

C. Objected Claims

In the Office action, claim 14 was objected to on the basis of the relationship of the term "material" in line 9 of the claim. Applicant has amended claim 14 to include "for said compensator layer" after "material."

Applicant respectfully requests that in view of the clarifying phrase noted above, the objection to claim 14 be removed.

D. Rejection under Section 112

Claims 14-19 were rejected under 35 U.S.C. 112, second paragraph, because independent claim 14 included two references to "a" substrate, so that it was not clear if there was more than one substrate. Amended claim 14 corrects the error. It is respectfully submitted that the amended claims satisfy the requirements of Section 112.

E. Rejection of Claims 14, 17 and 18

In the Office action, claims 14, 17 and 18 were rejected as allegedly being unpatentable over Krishnaswamy et al. in view of Peduto et al. In response to the rejection, Applicant has amended claim 14 to more clearly distinguish the claimed invention from the prior art. The step of forming a membrane on said substrate such that at least a portion of said membrane is suspended from contact with said substrate now reads forming an electrode-piezoelectric stack on said substrate such that a portion of said electrode-piezoelectric stack is suspended from contact with said substrate. As will be explained in greater detail below, Krishnaswamy et al. (Fig. 5b) makes a clear distinction between "the membrane" and "the electrode-piezoelectric stack" of the prior art device. The cited reference teaches that the membrane is suspended from contact with the substrate. In comparison, Applicant's claimed invention is one in which the electrode-piezoelectric stack is

suspended from contact with the substrate and defines a boundary of a substrate cavity. Equally importantly, the prior art reference teaches that its "compensator layer" (identified as the left piezoelectric film in Fig. 5b) is adjacent to the stack, rather than being in direct contact with the electrode-piezoelectric stack.

F. Patentability of Claims 14 and 17 under Section 103

The Office action cites Krishnaswamy et al. as teaching that the materials of the electrode-piezoelectric stack and compensator layer have a negative temperature coefficient of frequency and/or positive temperature coefficient of frequency. Krishnaswamy et al. teaches the electrode-piezoelectric stack and "compensator layer" are formed on a membrane adjacent to one another (Fig. 5b is cited in the Office action). None of the references cited in the Office action renders it obvious to modify the ladder architecture of Fig. 5b to provide a compensator layer in contact with the stack.

Moreover, Applicant's claimed invention does not employ a membrane suspended over a cavity, as taught by Krishnaswamy et al. In the method of pending claim 14, the electrode-piezoelectric stack is suspended over the cavity and defines a boundary for the cavity. This is neither taught nor suggested by the prior art, either alone or in combination.

Peduto et al. teaches that a cut crystal or piezoelectric material has a selectable temperature coefficient of frequency achievable by varying its linear dimensions, modulus of elasticity and density. Claim 17 was rejected as allegedly being unpatentable over Krishnaswamy et al. in view of Peduto et al. because the cited references teach that the linear dimensions, i.e., thickness, of the compensator layer can be selected to match a magnitude of temperature-induced effects of resonance or temperature ranges of resonance. Applicant respectfully points out that the cited references do not teach that the temperature coefficient of frequency for ferromagnetic materials is selectable by varying said ferromagnetic material's linear dimensions, density or modulus of elasticity. Furthermore, neither Krishnaswamy et al. nor Peduto et al. suggests that a ferromagnetic material be used as a compensator layer.

Applicant respectfully asserts that differences exist between its claimed invention and the combined teachings of Krishnaswamy et al. and

Peduto et al. and requests reconsideration of the patentability of claims 14 and 17.

G. Patentability of Claim 18 under Section 103

In the Office action, claim 18 was rejected under 35 U.S.C. 103(a) as being unpatentable over Krishnaswamy et al. in view of Peduto et al., wherein Krishnaswamy et al. (Fig. 5b) allegedly teaches forming a metallic flashing layer on a bottom side of a "compensator layer" opposite the electrode-piezoelectric stack. Applicant notes that such an interpretation of the prior art requires that the membrane as shown in Fig. 5b also acts as the compensator which is suspended from contact with the substrate. Furthermore, the cited reference (page 532, paragraph 2) suggests that the membrane/compensator is comprised of a semiconductor material.

Applicant respectfully asserts that the prior art teaches away from the claimed invention in the following manner: (1) Applicant's claimed invention does not describe the use of a membrane layer as being utilized as a compensator layer (in the claimed invention, no membrane exists and the compensator layer has only one function); (2) the bottom electrode is suspended from contact with the substrate, not a membrane as shown in Fig. 5B; and (3) Applicant's claimed invention describes the compensator layer as being comprised of a ferromagnetic material.

In conclusion, Applicant respectfully requests reconsideration of the patentability of claim 18, as amended.

H. Patentability of Claim 15 under Section 103

Claim 15 was rejected as allegedly being unpatentable over Krishnaswamy et al. in view of Peduto et al. in further view of Kompanek. The Office action cited Kompanek as teaching piezoelectric materials which may be formed of alloys and Krishnaswamy et al. teaches that compensators may be comprised of piezoelectric materials.

Applicant respectfully points out that piezoelectric materials do not exhibit their desired characteristics unless subjected to mechanical stress and/or an electric field. The cited reference, Krishnaswamy et al. (Fig. 5b) depicts the compensator as a piezoelectric material in contact with an electrode in which said electrode is connected to a lead for the purpose of

applying an electric field to achieve the desired characteristics of piezoelectric properties. In comparison, Applicant's use of a ferromagnetic material is a compensator layer, having a high magnetic permeability, requires no said mechanical stress or electric field to exhibit its desired characteristic, as shown in Fig. 2 of Applicant's claimed invention. It is therefore asserted that the sequence of steps of the pending claims is not rendered obvious by the cited prior art.

I. Patentability of Claim 19 under Section 103

Claim 19 was rejected as allegedly being unpatentable over Krishnaswamy et al. in view of Peduto et al. in further view of Inoue et al.

In response to the rejection, Applicant has amended claim 19 to more clearly distinguish the claimed invention from the prior art. The amended claim now reads, "The method of claim 18 further comprising using fabrication alignment techniques in said steps (a) and (b) to prevent spurious mode generation resulting from partial coverage of said electrode-piezoelectric stack by said compensation layer."

As the Office action points out, the cited reference Krishnaswamy et al. does not teach a method of fabricating alignment that prevents spurious mode generation due to partial coverage of a suspended membrane. The Office action cites Inoue et al. as teaching the use of a suspended membrane as part of a membrane structure that prevents spurious mode generation resulting from a partial coverage of the membrane.

Applicant respectfully asserts that its claim amendment is materially different than the prior art in that it describes a method of fabrication alignment techniques to prevent spurious mode generation resulting from partial coverage of the electrode-piezoelectric stack by a compensator layer. This is neither taught nor suggested by the cited prior art, either alone or in combination.

Applicant respectfully requests reconsideration of the claims in view of the amendments and remarks made herein. A notice of allowance is earnestly solicited. In the case that any issues regarding this application can

be resolved expeditiously via a telephone conversation, Applicant invites the Examiner to call Terry McHugh at (650) 969-8458 or Pamela Lau Kee (408)-553-3059.

Respectfully submitted,

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